FY 2012

SOUTH COUNTY WATER QUALITY TESTING REPORT

Santa Clara Valley Water District

Front Cover: District staff prepares to collect a water quality sample from a South County private domestic well.

FY 2012

SOUTH COUNTY WATER QUALITY TESTING REPORT

SECTIONS

Executive Summary

1 Water Quality Testing Program Overview

2 Results and Discussion

3 Appendix

Prepared Under the Direction of:

Beau Goldie
Chief Executive Officer

James Fiedler
Chief Operating Officer, Water Utility Enterprise

Joan Maher
Deputy Operating Officer, Water Supply Division

Behzad Ahmadi
Unit Manager, Groundwater Monitoring and Analysis Unit

Contributors:

Henry Barrientos, Associate Engineer
Randy Behrens, Water Quality Specialist II
Vanessa De La Piedra, Senior Water Resources Specialist
John McHugh, Assistant Engineering Geologist

Graphic Design
(Cover and Table of Contents):

Joy O. Lim

Board of Directors:

Linda J. LeZotte, Chair - District 4
Patrick Kwok, Vice Chair – District 5
Donald Gage – District 1
Joe Judge – District 2
Richard Santos – District 3
Tony Estremera – District 6
Brian Schmidt – District 7

EXECUTIVE SUMMARY

The Santa Clara Valley Water District (District) initiated the South County Water Quality Testing Program in Fiscal Year (FY) 2012 as a pilot water quality testing program for private domestic well owners in southern Santa Clara County. Between October 2011 and April 2012, the District tested 280 private domestic wells in the Coyote Valley and Llagas Subbasin for common contaminants and water quality indicators including nitrate, bacteria, electrical conductivity, and hardness.

The District conducts annual groundwater quality monitoring to evaluate regional conditions and identify threats to water quality in order to protect groundwater resources. Elevated nitrate is an ongoing groundwater quality challenge due to historic and ongoing sources including synthetic fertilizers, septic systems, and animal wastes. While nitrate is included in the District's regional groundwater monitoring, there are many areas where no data is collected. The collection of localized data helps improve the District's understanding of the occurrence of contaminants and supports District Board Policy 2.1.1 "Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize land subsidence and salt water intrusion." This program also provides important information to well owners on the quality of their well water, which helps them to better protect their health. The testing of private domestic wells is not mandated by state or local agencies and, as such, contaminants may go undetected for long periods of time.

Implementation of this program included the identification of parameters to be tested and related sampling protocols, development of program outreach materials, appointment scheduling, the collection and analysis of water quality samples, and reporting of results to participants. Participating well owners were provided with a laboratory report within 3 weeks of the sample collection date, along with related outreach materials to help understand the results. When contaminants were detected above health-based standards, District staff notified well owners by telephone as soon as the preliminary lab results were received, which was generally within 3 days of sampling. Well owners were also offered additional information on the contaminant detected and possible remedies, including well disinfection and water treatment.

Testing results show that nitrate was detected above the health-based Maximum Contaminant Level (MCL)[1] of 45 milligrams per liter (mg/L) at 31% of domestic wells tested. The percent of wells exceeding the health-based standard for nitrate has dropped compared to the last large sampling effort conducted by the District in 1998, when over 50% of wells tested had nitrate above the drinking water standard. Nitrate levels were generally higher in wells tested in the confined area of the Llagas Subbasin (median level of 58 mg/L) as opposed to recharge areas in the Coyote Valley and Llagas Subbasin (median levels of 35 and 29 mg/L, respectively). Wells tested near District groundwater recharge facilities also showed lower levels of nitrate and a lower incidence of exceeding the MCL. About 14% of wells within 2,000 feet of a District recharge facility had nitrate above the MCL while 40% of wells tested in all other areas exceeded the MCL. This suggests that the District's managed recharge of high quality local and imported surface water is helping to reduce nitrate concentrations in groundwater.

[1] Maximum Contaminant Levels are established by the California Department of Public Health (CDPH) and must be met by public water systems.

Coliform bacteria were detected at 38% of private wells tested. Coliform bacteria are naturally present in humans, animals, and the environment and do not normally cause illness, but they should not be present in drinking water. Coliform bacteria are used as an indicator that other, potentially harmful, bacteria may be present. Escherichia coli (E. coli), a bacterium that only occurs in the digestive track and feces of humans and animals and indicates fecal contamination, was detected in three wells (1% of wells tested). Coliform bacteria detections throughout the Coyote Valley and Llagas Subbasin are generally randomly distributed and no distinct spatial pattern was observed. The presence of coliform bacteria in many wells is likely a result of individual well characteristics that allow foreign matter to enter the well, introducing bacteria rather than a regional groundwater issue. Wells located in upland areas near the boundary between the groundwater subbasins and adjacent mountains had a higher incidence of total coliform compared to other areas. E. Coli was also only detected in wells located in upland areas. The cause may be the lack of surface soil above the bedrock, which reduces natural filtration, or the presence of fractures within the bedrock that allow the transport of surface water containing bacteria into the well.

Electrical conductivity was tested to provide a general indicator of the suitability of water for ordinary domestic purposes. The median electrical conductivity for all wells tested was 666 micromhos per centimeter (umhos/cm). There is no health-based standard for electrical conductivity, but the CDPH has established an aesthetic-based standard, which is given as a range. The lower, recommended limit is 900 umhos/cm and the upper limit is 1,600 umhos/com. Approximately 15% of wells tested exceeded the recommended lower limit and less than 1% exceeded the upper limit. This indicates that with respect to total mineral salts, groundwater quality is generally suitable for domestic use in the areas tested. Electrical conductivity in wells near District recharge facilities was lower than in other areas measured, with a median concentration of 580 umhos/cm.

Measurements of water hardness were provided as additional information that may prove useful for well owners considering water treatment systems to remove nitrate or other contaminants. The median hardness concentrations in approximately 90% of the wells tested was 268 mg/L (as calcium carbonate), which is classified as very hard water. A slight decrease in median concentrations near District recharge facilities was observed and reported at 240 mg/L (as calcium carbonate). Although they were not identified as parameters of specific interest for this testing program, the laboratory test method for nitrate also provides results for bromide, fluoride, sulfate and phosphate. There were not any results above health-based or aesthetic drinking water standards for these parameters.

Well owner feedback was compiled based on customer surveys submitted to the well owners with their laboratory results. Approximately 35% of the surveys were returned and the overall feedback was very positive. Based on the survey results, additional effort should be made to simplify the reporting and explanation of the testing results. The relatively high occurrence of total coliform bacteria also suggests that additional outreach to domestic well owners on wellhead protection may be beneficial. The continued presence of nitrate above the MCL in many domestic wells also highlights the need for continued efforts to reduce customer exposure to nitrate through targeted outreach and to reduce nitrate loading in coordination with the Central Coast Regional Water Quality Control Board and basin stakeholders.

This testing program helped the District to better understand the occurrence of nitrate and other contaminants, and provided important water quality information to domestic well owners so they can better protect their health. The District plans to continue this program in FY 2013 and will work to improve the program based on well owner feedback.

1 2012 SOUTH COUNTY WATER QUALITY TESTING REPORT
Water Quality Testing Program Overview

1.1 INTRODUCTION

The Santa Clara Valley Water District (District) initiated the South County Water Quality Testing Program to collect and evaluate localized data on nitrate and other contaminants in southern Santa Clara County (South County) to protect groundwater quality in accordance with District Board Water Supply Objective 2.1.1: "Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize land subsidence and salt water intrusion." The program also provides important information to domestic well owners.

The District conducts annual groundwater quality monitoring to evaluate regional groundwater quality conditions and identify threats to water quality so that further action can be taken if needed to protect groundwater resources. Nitrate is included in the District's regional monitoring program, but there are many areas where no data is collected. The District's regional groundwater monitoring indicates that wells in South County generally produce high quality water and do not frequently contain organic compounds, toxic metals, or pesticides[1]. However, elevated nitrate is an ongoing groundwater quality challenge due to historic and ongoing sources including synthetic fertilizers, septic systems, and animal wastes. Nitrate concentrations in South County are generally elevated above natural background concentrations of 10 milligrams per liter (mg/L)[2] and some wells have nitrate above the Maximum Contaminant Level (MCL)[3] of 45 mg/L.

Groundwater is the sole source of drinking water supply for residents of South County and homes within the unincorporated areas are commonly served by privately owned and operated domestic wells. South County has about 3,000 wells registered as domestic supply wells and approximately 500 registered as combined agricultural and domestic supply wells. Unlike public water systems, domestic wells are not required by federal, state, or local agencies to perform regular water quality testing. Because basic water quality testing may not be regularly performed, residents may unknowingly consume water with unhealthy impurities such as bacteria and nitrate, two common groundwater contaminants found in rural areas. A 2010 District survey of well owners indicated very strong support for the District to offer water quality testing.

To supplement the District's regional monitoring and provide private domestic well owners with important information on their water quality, the District initiated this pilot water quality testing program for South County domestic well owners in FY 2012. As part of this program, the District sampled 280 domestic wells between October 2011 and April 2012. The results of that sampling are described in this report.

1.2 STUDY AREA

The District offered free basic water quality testing to well owners within Groundwater Charge Zone W5 (Zone W5), which includes all of South County. Zone W5 generally coincides with the Coyote Valley and Llagas Subbasin, which are briefly described in this section.

---

[1] Santa Clara Valley Water District, 2011 Groundwater Quality Report, June 2012.

[2] United States Geological Survey, Source and transport controls on the movement of nitrate in public supply wells in selected principal aquifers of the United States, 2008.

[3] Maximum Contaminant Levels are established by the California Department of Public Health (CDPH) and must be met by public water systems.

Santa Clara County includes two groundwater subbasins as defined by the California Department of Water Resources (DWR)[4]: the Santa Clara Subbasin (Subbasin 2-9.02) and the Llagas Subbasin (Subbasin 3-3.01). Due to different land use and management characteristics, the District further divides the Santa Clara Subbasin into two groundwater management areas: the Santa Clara Plain and the Coyote Valley.

The Coyote Valley is generally comprised of high permeability sands and gravels, and groundwater occurs under unconfined conditions. The Llagas Subbasin is divided into confined and recharge (unconfined) areas (Figure 1-1). Confined areas contain laterally extensive low permeability clays and silts that impede the vertical flow of groundwater. By restricting the movement of contaminants, confining units also provide some natural protection to deep aquifers. Recharge areas are primarily comprised of high permeability aquifer materials like sands and gravels that allow surface water to infiltrate into the aquifers. Most groundwater recharge occurs in these areas through the infiltration of precipitation and the District's managed recharge to augment groundwater supplies.

Because of slight differences in the boundaries of Zone W5 (a political boundary) and the groundwater subbasins, this report also contains data for the "uplands" which refers to areas within Zone W5 but outside the groundwater subbasins as identified by DWR.

1.3 NITRATE MANAGEMENT EFFORTS

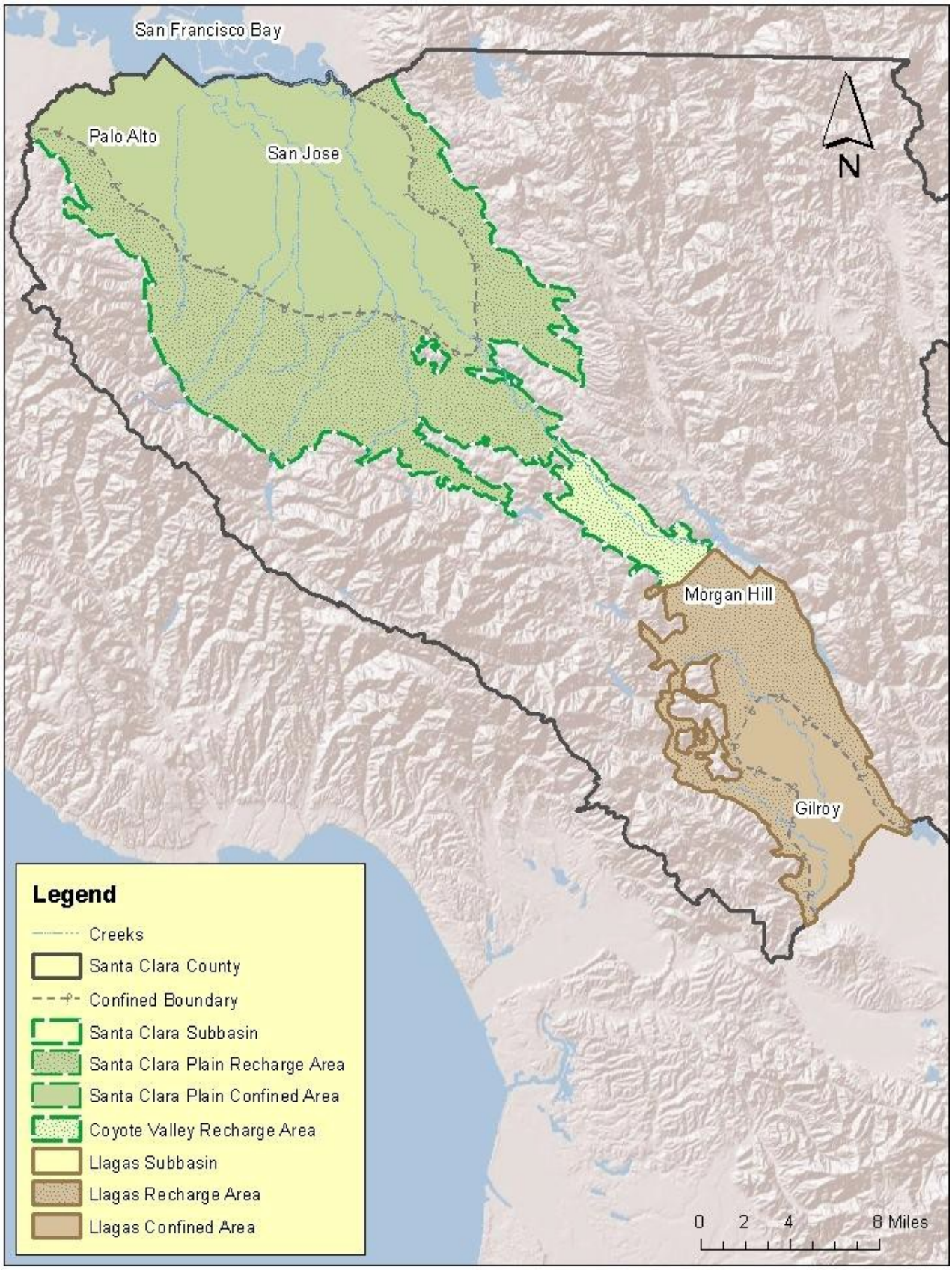
Previous nitrate monitoring in South County includes efforts by DWR, the Santa Clara County Department of Environmental Health, and the District. DWR tested nitrate at over 50 individual wells in the Llagas Subbasin between 1955 and 1960 and also compiled available results dating back to 1949[5]. About 19% of wells tested had nitrate above the MCL at least once during the period reported. DWR later tested over 160 wells in South County in 1978 and 1979[6] and that sampling effort indicated that 22% of the wells tested had nitrate above the MCL. In 1988, the Santa Clara County Department of Public Health completed a 2-year countywide program to test private wells, which include sampling 542 wells in South County[7]. About 30% of wells tested under that effort contained nitrate above the MCL. The District has analyzed nitrate in its regional monitoring program for many years, but the last large scale testing program for South County domestic wells conducted by the District was in 1998. Under that program, approximately 600 South County wells were tested for nitrate[8]. Results indicated that about half of the wells tested were at or above the MCL.

The District has implemented numerous programs and activities to define the extent and severity of nitrate contamination, identify potential sources, reduce nitrate loading, and reduce customer exposure to nitrate. These efforts have included groundwater monitoring, in-field nutrient assistance programs for growers between 2002 and 2007, and various outreach activities. Current efforts focus on groundwater recharge to help dilute nitrate, the evaluation of nitrate data to assess hot spots and trends, public outreach, and collaboration with other agencies to increase water and nutrient use efficiency. Nitrate management strategies will also be evaluated as part of the regional salt and nutrient management plans, which are scheduled to be completed in 2014 in coordination with groundwater basin stakeholders.

---

[4] California Department of Water Resources, Bulletin 118, 2003.
[5] California Department of Water Resources, Mineral Quality Criteria South Santa Clara Valley, 1963.
[6] California Department of Water Resources, South Santa Clara Valley Groundwater Quality Investigation, Memorandum Report, June 1980.
[7] Santa Clara County Health Department, Santa Clara County Private Well Sampling Program Final Report, September 1988.
[8] Santa Clara Valley Water District, Private Well Water Testing Program, Nitrate Data Report, 1998.

Figure 1-1 Santa Clara County Groundwater Subbasins



1.4 PROGRAM OVERVIEW

A total of 280 domestic wells located within the Coyote Valley and Llagas Subbasin were sampled as part of this pilot program conducted by the District. The program was conducted between October 2011 and April 2012 and was offered to all private domestic well owners within Groundwater Charge Zone W5 that benefit from District groundwater management activities. A summary of the number of wells participating by geographic area is shown in Table 1-1 below.

Table 1-1 Summary of Participating Wells

Location	Number of Wells Tested	Percent of Total Tested
Santa Clara Subbasin - Coyote Valley	35	12.5%
Llagas Subbasin	231	82.5%
Uplands	14	5.0%
Total	280	-

Implementation of this program included the identification of parameters to be tested and related sampling protocols, development of program outreach materials, appointment scheduling, the collection and analysis of water quality samples, and reporting of results. These program elements are described in the following sections.

1.4.1 Water Quality Parameters Tested

One of the main objectives of this program was to provide basic water quality information to residents served by domestic wells so they can better protect their health. Sources of drinking water can become contaminated through naturally occurring elements such as arsenic and radon, but are more often polluted by human activities at or near the land surface. Contamination of a private well can impact not only the household served by the well, but also nearby households using the same shared aquifer.

The presence of contaminants in water can lead to health issues, including gastrointestinal illness, reproductive problems, and neurological disorders. Infants, young children, pregnant women, the elderly, and people whose immune systems are compromised may be more susceptible to illness from some contaminants. The Center for Disease Control (CDC) suggests every private well should be sampled every year for coliform bacteria, nitrate, and any other contaminants of local concern[9]. Certain types of coliform bacteria can be considered as an indicator of the likely presence of other pathogens, which are the leading cause of waterborne illness in the U.S., such as hepatitis A, giardia, salmonella, and Escherichia coli (E. coli) O157:H7.

The parameters chosen for testing under this District program were nitrate, bacteria, electrical conductivity, and hardness for the reasons described below. The laboratory method for nitrate also provides results on other parameters including bromide, fluoride, phosphate, and sulfate. Although these were not targeted parameters, these results were also provided to participants.

Where applicable, laboratory results were compared to both health-based maximum contaminant levels (MCL) and secondary maximum contaminant levels (SMCL), which are aesthetic thresholds related to the appearance, taste, or

[9] CDC Website: http://www.cdc.gov/healthywater/drinking/private/wells/diseases.html

odor of water. The analytical methods and associated parameters, and threshold types are summarized in Table 1-2.

Table 1-2 Parameters Tested and Related Drinking Water Standards

Parameter	Units[1]	MCL[2]	SMCL[3]
Bromide	mg/L	--	--
Electrical Conductivity	umhos/cm	--	900 (1,600)
E. Coli	P/A in 100 mL	--[4]	--
Fluoride	mg/L	2	--
Hardness (as $CaCO_3$)	mg/L	--	--
Nitrate (as NO_3)	mg/L	45	--
Phosphate	mg/L	--	--
Sulfate	mg/L	--	250 (500)
Total Coliform Bacteria	P/A in 100 mL	--[4]	--

Notes:
1. mg/L = milligrams per liter; umhos/cm = micromhos per centimeter; P/A = present/absent
2. MCL = Maximum Contaminant Level, or health-based standard set by the California Department of Public Health (CDPH).
3. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, set by the CDPH.
   For SMCLs given as a range, the lower recommended value is listed first, with the upper limit shown in parentheses.
3. A public water system collecting fewer than 40 samples per month is in violation of the total coliform MCL if more than one sample is total coliform positive or if there is a repeat positive for fecal coliform or E. coli.

Nitrate

Nitrate was chosen as one of the basic water quality parameters to be tested since it is known to be present above the MCL in many wells. Elevated nitrate is of special concern for households with infants and pregnant women. Infants' digestive systems lack the ability to counteract the effects of elevated nitrate, which may result in a serious medical condition known as methemoglobinemia, or blue baby syndrome. Because it is odorless and tasteless, nitrate can be present in high concentrations without any indication. Nitrate has a health-based drinking water standard of 45 mg/L.

Coliform Bacteria

Coliform bacteria are a commonly used bacterial indicator of the sanitary quality of food and water. They are present in the environment, in soil, on vegetation, and in large numbers in the digestive tract and feces of warm blooded mammals but should not be present in drinking water. While coliform bacteria do not normally cause serious illness, their presence is used to indicate other harmful pathogenic organisms that may be present. The presence of coliform bacteria of fecal origin was determined by testing for a specific type of coliform bacteria known as Escherichia coli (E. coli). A mutated strain of E. coli can cause serious illness, but most E. coli is harmless and is used as an indicator of the likely presence of other pathogens that are either too difficult or costly to detect in drinking water. The results for the coliform tests performed were reported as either "absent" or "present".

Bacteria may pose a special health risk for infants, young children, the elderly, and people with severely compromised immune systems. Depending on the size of the system, public water systems are required to monitor for bacteria to ensure that few or no samples test positive for total coliform bacteria.

Electrical Conductivity

Electrical conductivity is a measure of all the dissolved substances in water and can be used as a low-cost surrogate for total dissolved solids (TDS), a primary indicator of the suitability of water for domestic purposes. There are no health effects associated with electrical conductivity, but the California Department of Public Health has established a range for the SMCL, with a lower recommended limit of 900 micromhos (umhos/cm) and an upper limit of 1,600 umhos/cm. Electrical conductivity can be used to estimate TDS in milligrams per liter (mg/L). For waters with mostly bicarbonate alkalinity and chloride as is typical in Santa Clara County, the electrical conductivity can be multiplied by 0.55 to estimate TDS[10]. For example, a reported electrical conductivity of 664 umhos/cm corresponds to an approximate TDS value of 365 mg/L.

Hardness

Hardness of water refers to the presence of certain dissolved minerals (mostly calcium and magnesium) which tend to form insoluble precipitates with soap and leave unattractive residues on plumbing fixtures. Hardness is not considered a health concern and there is no related drinking water standard. However, because the hardness of water is important to know for many water conditioning and treatment systems such as reverse osmosis units used to treat nitrate and other contaminants, it was tested under this program. Table 1-3 below provides information on hardness classifications[10].

Table 1-3 Hardness Classification

Grains Per Gallon	Milligrams Per Liter (mg/L) or Parts Per Million (ppm)	Classification
1.0-3.5	Less than 60	Soft
3.5 - 7.0	60 - 120	Moderately Hard
7.0 - 10.5	121 - 180	Hard
Over 10.5	Over 180	Very Hard

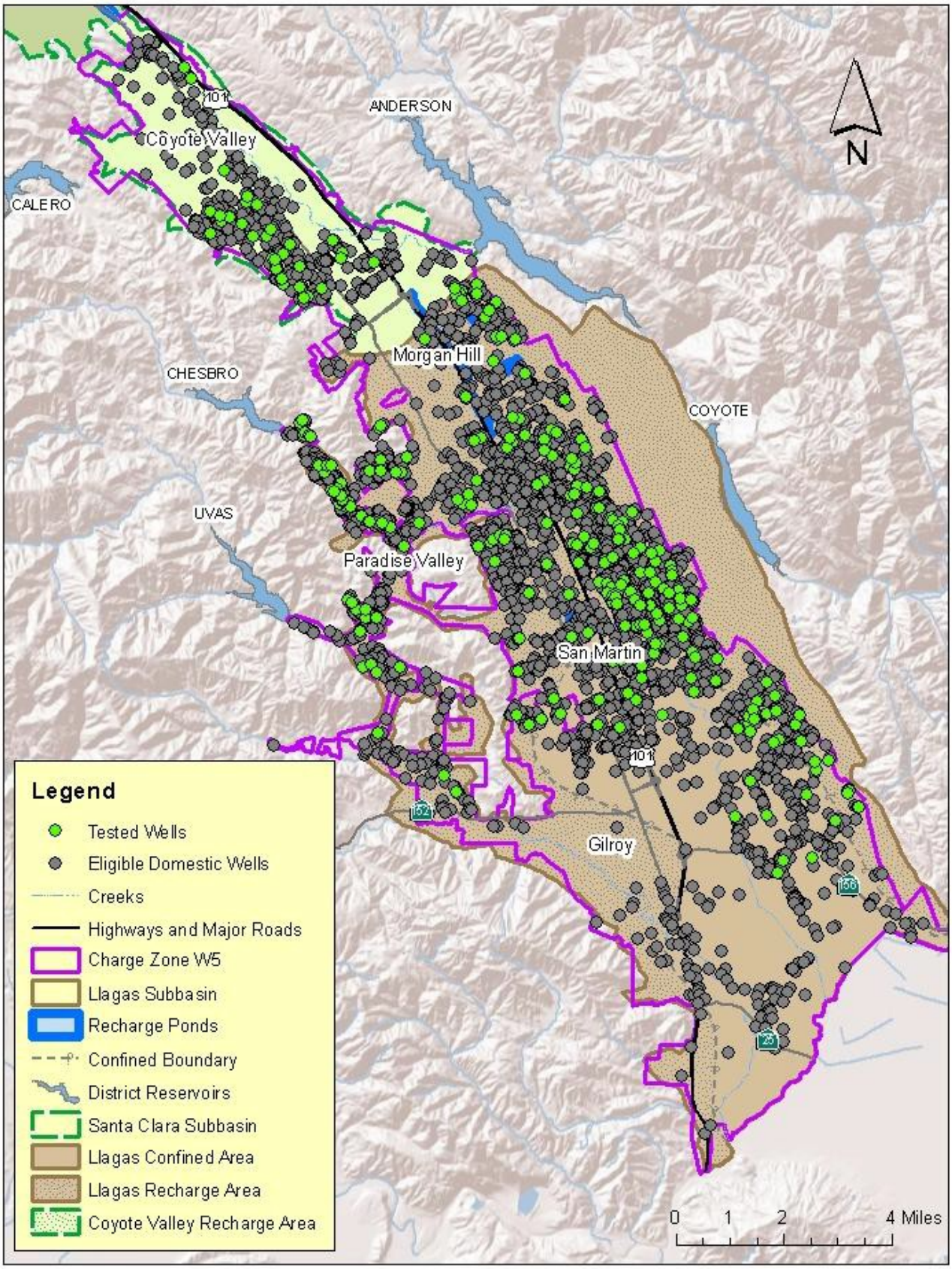
1.4.2 Outreach and Scheduling

In an effort to announce this program, the District mailed out program notification post cards to the registered owners of 3,516 private domestic well owners in the study area (Figure 1-2). The post cards were mailed in three separate batches between September 29 and October 20, 2011 to ensure staff availability and prompt response to potential participant inquires. The first batch of well owners to receive the mailer was selected from areas where little or no information on groundwater quality existed in District records. The other two batches were sent out shortly afterwards using a random selection process to avoid giving any particular well owner or group of owners priority over others, such as would occur with a simple alphabetical scheme.

A Groundwater Hotline was established to direct incoming calls to the appropriate staff. Well owners could either schedule an appointment by calling the hotline or by using Access Valley Water, the District's online customer service center. A database was developed to store participant information, including contact information and appointment date. The District also developed a dedicated webpage with information on the free testing program.

[10] Hem, J.D., Study and Interpretation of the Chemical Characteristics of Natural Waters, 1985.

Figure 1-2 Eligible Domestic Wells and Wells Tested



Testing was offered on a first-come, first-served basis and the wells tested under this program are shown in Figure 1-2. Participant eligibility was confirmed by District staff prior to scheduling an appointment to conduct the field sampling. Eligibility criteria included the following:

- Testing was only available to private domestic well owners in Groundwater Charge Zone W5.
- Participants were required to sign a participation agreement allowing the District to enter their property to collect a water sample.
- In the case of shared wells, only one sample was collected and results were shared with other well users upon request.

Each participant was given a choice of sample collection appointment times for convenience. Once the appointment was scheduled, participants were mailed the participation agreement and a fact sheet with their scheduled appointment date and time, and information on what to expect during the sample collection. Staff also provided reminder calls 1 to 2 workdays prior to the appointment as a courtesy to participants. The participation agreement and fact sheet are included in the Appendix.

1.4.3 Sample Collection and Quality Assurance

Two samplers collected the water quality samples to ensure staff safety and reduce appointment time. In most cases, samples were collected from an outside faucet at the well head or in close proximity. Sometimes samples were collected from inside faucets (at the kitchen sink) if the homeowner stated that no water treatment systems were present. In all cases, an attempt was made to obtain a sample of raw groundwater prior to any treatment, filtration, or storage. In a few cases, this was not possible since some well owners had filtration systems at the well head that could not be bypassed and some well owners did not know if a treatment system existed.

Staff was trained in the proper sample collection methods for the targeted water quality parameters. The coliform bacteria tests performed demanded the most attention as those samples are most sensitive to contamination by improper handling and storage. The faucet where the sample was collected was first flushed, then cleaned with alcohol to rid the exposed surfaces of any bacteria, and was then flushed again for approximately 5 minutes to flush the lines of stagnant water and any remaining alcohol residue. This minimal amount of flushing was considered adequate since household wells are generally used on a daily basis and stagnation is usually not an issue.

Staff collected the water quality samples using the appropriate sampling method and answered any questions from the well owner. With the owner's consent, the location of each well was also confirmed using a global positioning system (GPS) unit. A copy of the District's Guide for the Private Well Owner[11] was left with the well owner to provide information on well maintenance and water quality testing. Sampling information was recorded on a standard laboratory chain-of-custody form and samples were transported on ice to the District laboratory, a California Department of Health (CDPH) certified laboratory.

1.4.4 Reporting of Laboratory Results

For results above health-based drinking water standards or in the case coliform bacteria were present, staff notified the well owner by phone as soon as the preliminary laboratory results were available, usually within about 3 days of the sample collection date. Other informational items were offered at this time to help the well owner understand and

[11] Available on www.valleywater.org

remedy the conditions that prompted the notification. This included information on nitrate, bacteria, treatment options and techniques, and general well maintenance. Examples of informational items provided to well owners are included in the Appendix of this report.

Complete laboratory results along with a fact sheet on understanding water quality results were sent to participants within about 3 weeks of the sample collection date. A customer survey was also included in the results packet to obtain participant feedback on the testing program. Both the fact sheet and the survey are included in the Appendix and the survey results are summarized in Chapter 2.

2 2012 SOUTH COUNTY WATER QUALITY TESTING REPORT
Results and Discussion

2.1 WATER QUALITY TESTING RESULTS

The following sections discuss the testing results for the four main parameters targeted for testing (bacteria, nitrate, electrical conductivity, and hardness). As discussed in Chapter 1, the laboratory method for nitrate also produces data on other "non-targeted" parameters including bromide, fluoride, sulfate, and phosphate and these are also summarized in this section. The laboratory report provided to participants contained all testing results.

2.1.1 Coliform Bacteria

Two tests for coliform bacteria were performed: total coliform and E. coli. The test for total coliform is an indicator test and includes a large group of bacterial species. One of the more concerning to human health is E. coli, a bacterium that occurs in the digestive track of humans and animals[1]. If total coliform is present but E. coli is absent, that indicates a possible entry point for foreign matter such as leaves, insects, soil, or storm water into the well but contamination from sewage or animal waste is not likely. If both total coliform and E. coli are present, that is a likely indication of contamination by sewage or animal waste.

Sampling results show that total coliform bacteria was present at 107 wells or approximately 38% of wells tested. This is similar to monitoring results reported in a United States Geological Survey (USGS) study of domestic wells conducted in cooperation with the Pennsylvania Department of Agriculture[2]. The results indicate that for seven study areas monitored throughout Pennsylvania, an average of 44% of the wells tested had coliform bacteria present.

The results of the wells sampled by the District by geographic area are shown in Table 2-1. The wells containing coliform bacteria appear to be randomly distributed and no pattern is easily discernable (Figure 2-1) suggesting this condition results from unique aspects of individual wells rather than a regional groundwater issue. The exception to this was observed for wells in the upland areas, which show a higher incidence of total coliform than other areas. This may be attributed to well depth and lack of surface soil above the bedrock which would normally allow for increased filtration or fractures in the bedrock which may be providing an uninterrupted pathway for contaminated surface water infiltration to the wells.

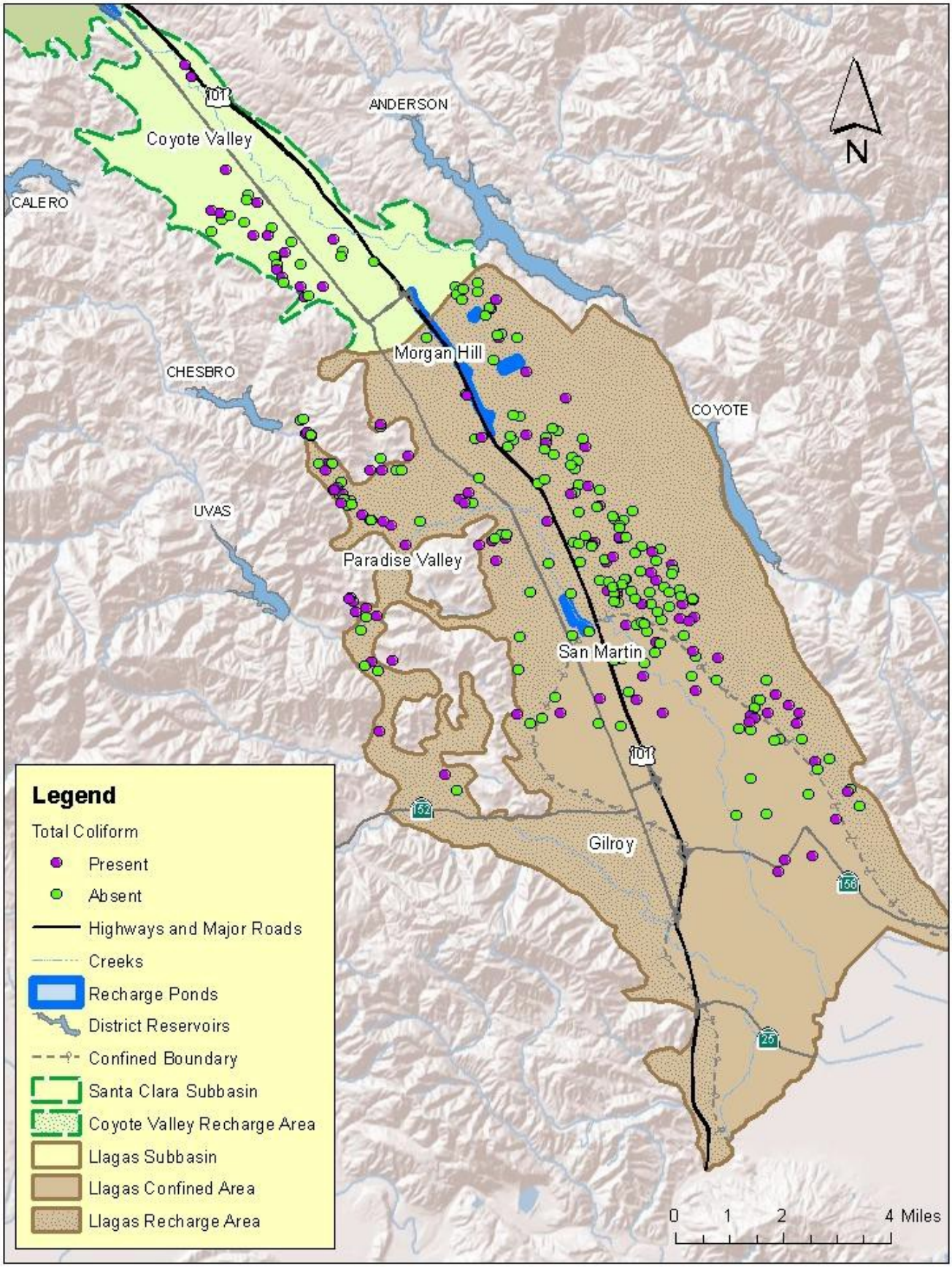
Table 2-1 Total Coliform Bacteria Results

Location	Number of Wells Tested	Number of Wells with Total Coliform Present	Percentage of Wells with Total Coliform Present
Coyote Valley, Recharge Area	35	16	46%
Llagas Subbasin, Recharge Area	192	66	34%
Llagas Subbasin, Confined Area	39	15	39%
Uplands	14	10	71%
Total	280	107	38%

[1] United States Environmental Protection Agency (EPA) Website, http://water.epa.gov/drink/contaminants/basicinformation

[2] United States Geological Survey (USGS), Relation Between Selected Well-Construction Characteristics and Occurrence of Bacteria in Private Household-Supply Wells, South-Central and South-Eastern Pennsylvania, Report 01-4206, 2001.

Figure 2-1 Total Coliform Results



Water systems with total coliform bacteria present likely have small openings that allow foreign material from the environment to enter, carrying bacteria on their surfaces. They also may have had bacteria introduced from repair work on the system. Once in the water system, the bacteria can multiply and colonize the inner surfaces of the well casing, discharge pipes, and distribution lines. These wells should be inspected by the well owners to identify and seal any entry points to prevent entry of foreign material. Even though no indication of dangerous pathogens was detected, water quality results are a "snapshot" in time and the absence of fecal contamination today does not guarantee that will be the case in the future. After all entry points have been sealed, these wells should be properly disinfected[3], and retested before being returned to service.

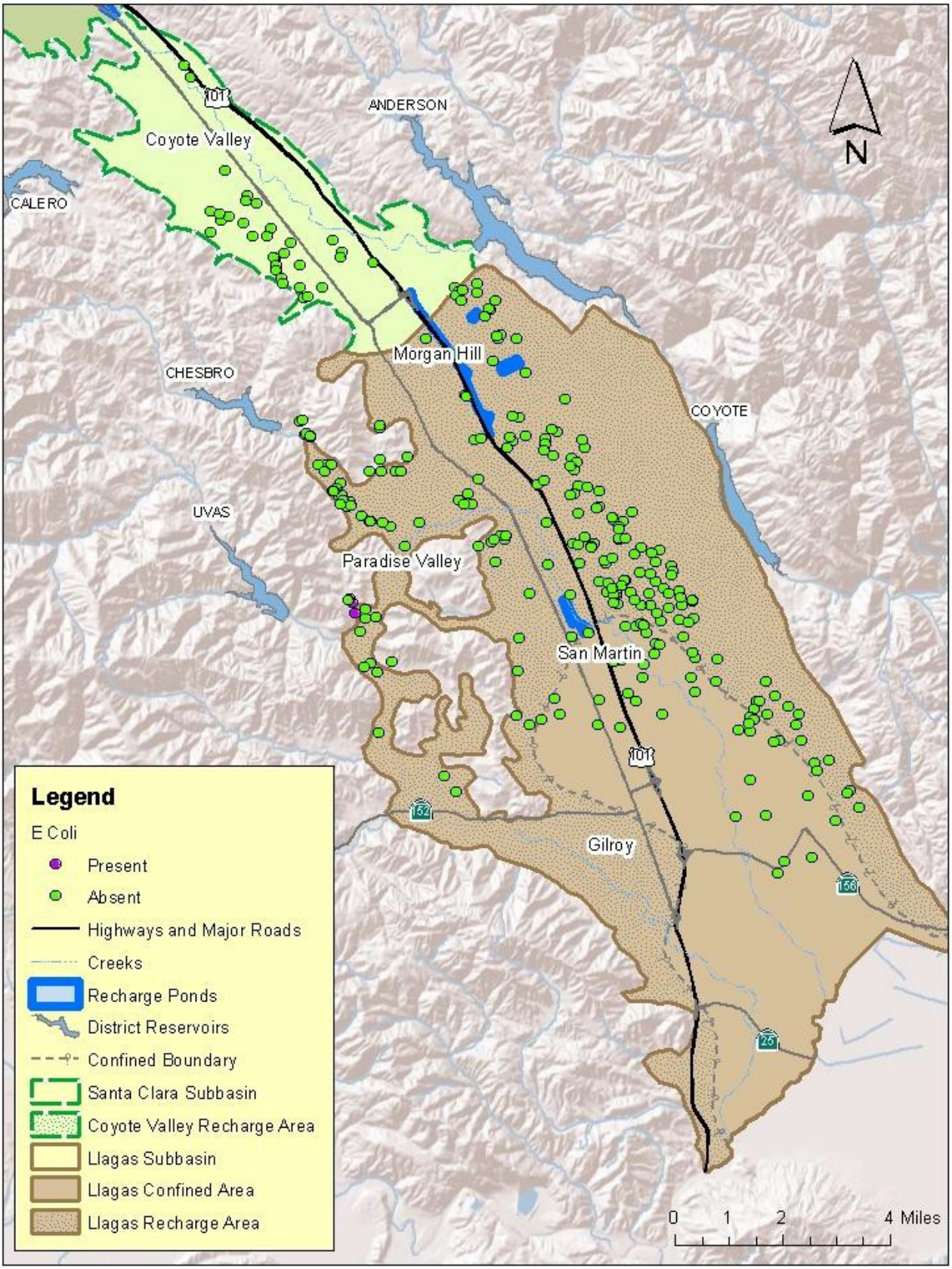
Sampling results for E. Coli show this bacteria was present in 3 wells, or 1% of the total wells tested (Table 2-2). Test results showing both total coliform and E. coli present were identified in one small region in the western portion of Morgan Hill affecting three wells in relatively close proximity (Figure 2-2). This condition may be due to inadequately maintained or malfunctioning septic systems. Additionally, local geologic factors can be an important consideration due to the lack of surface soil above the bedrock which reduces natural filtration, and fractures within the bedrock that allow the transport of surface water containing bacteria into the well.

Table 2-2 E. Coli Results

Location	Number of Wells Tested	Number of Wells with E.Coli Present	Percentage of Wells with E. Coli Present
Coyote Valley, Recharge Area	35	0	0%
Llagas Subbasin, Recharge Area	192	0	0%
Llagas Subbasin, Confined Area	39	0	0%
Uplands	14	3	21%
Total	280	3	1%

[3] Guidance on proper well disinfection can be found on the Santa Clara County Department of Environmental Health website at www.ehinfo.org

Figure 2-2 E. Coli Results



2.1.2 Nitrate

As part of this program, 280 private domestic wells were tested for nitrate in FY 2012. Approximately 31% (86 wells) contained nitrate above the drinking water standard of 45 mg/L set for public water systems. Nitrate results ranged from non-detect at the reporting limit of 2 mg/L to 250 mg/L, with a median nitrate concentration of 31 mg/L. For comparative purposes, the median nitrate concentrations in the Coyote Valley is 11.7 mg/L and 21.2 mg/L in the principal zone of the Llagas Subbasin based on the District's regional groundwater monitoring efforts in FY 2012[4].

A breakdown for each geographic area is provided in Table 2-3 and the nitrate results are depicted on Figure 2-3. Relatively low nitrate concentrations are encountered in the mountain valleys southwest of the City of Morgan Hill and higher concentrations are generally found east of Highway 101 in the unincorporated areas between Morgan Hill and San Martin. In the Llagas Subbasin, the percent of wells above the MCL in the confined area is about double the percent of wells above the MCL in recharge area.

Table 2-3 Nitrate Results

Location	Number of Wells Tested	Median Concentration (mg/L)	Number of Wells above the MCL	Percentage of Wells above the MCL
Coyote Valley, Recharge Area	35	34.7	6	17%
Llagas Subbasin, Recharge Area	192	29.3	56	29%
Llagas Subbasin, Confined Area	39	58.1	24	62%
Uplands	14	8.3	0	0%
Total	280	30.9	86	31%

Notes: mg/L=milligrams per liter; MCL= Maximum Contaminant Level of 45 mg/L established by the California Department of Public Health (CDPH).

The distribution of results indicates nitrate concentrations in close proximity to District managed recharge facilities are generally lower than those in the confined areas and other recharge areas. The median nitrate concentration in wells within 2,000 feet of recharge facilities is around 18 mg/L, compared to 39 mg/L for all other areas, as indicated in Table 2-4.

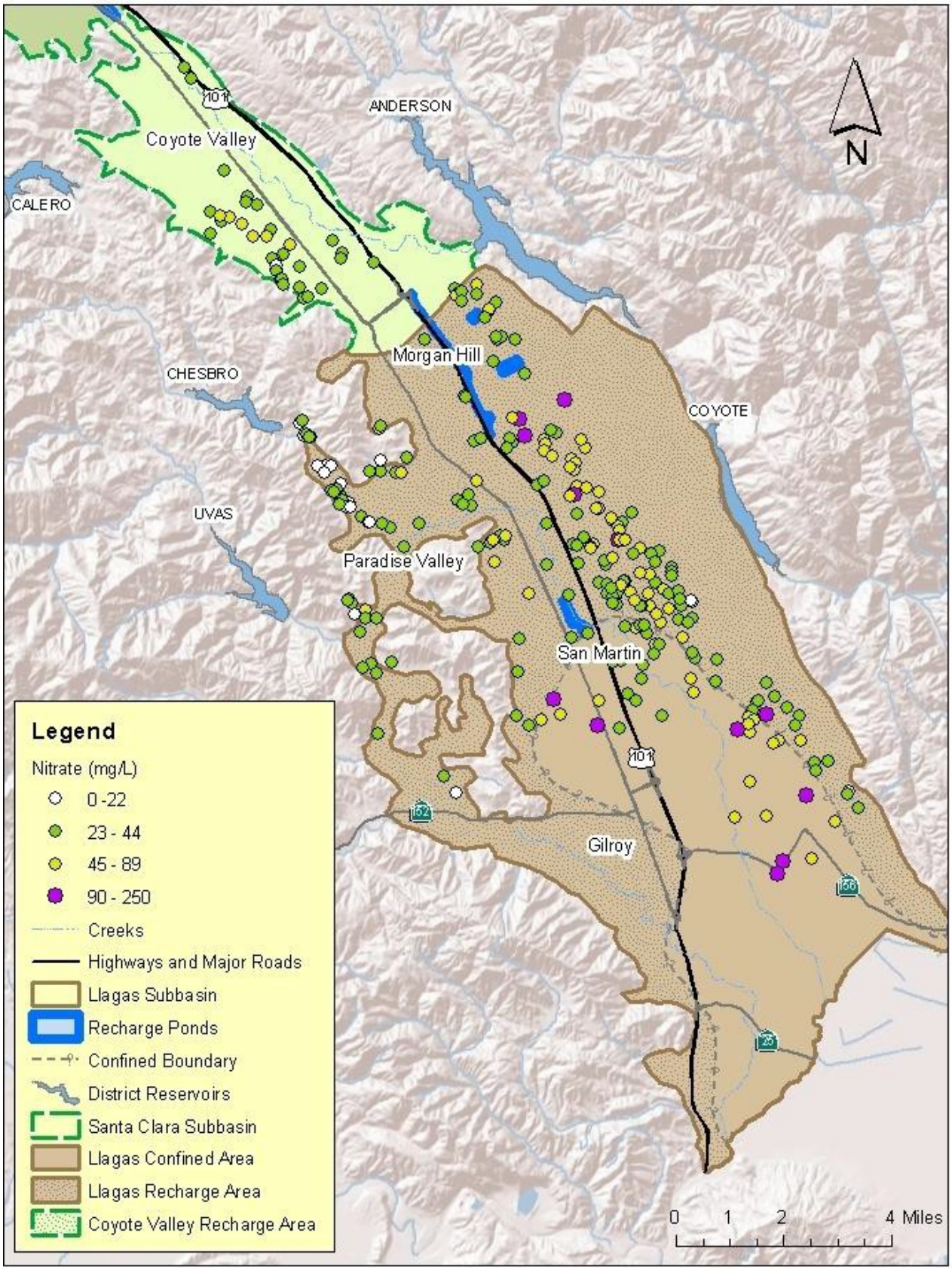
Table 2-4 Nitrate Results Near District Recharge Facilities

Location	Number of Wells Tested	Median Concentration (mg/L)	Number of Wells above the MCL	Percentage of Wells above the MCL
Within 1,000 Feet of District Recharge Facility	68	17.6	7	10%
Within 2,000 Feet of District Recharge Facility	97	18.2	14	14%
All Other Areas	183	38.8	73	40%

Notes: mg/L=milligrams per liter; MCL= Maximum Contaminant Level of 45 mg/L established by the CDPH.

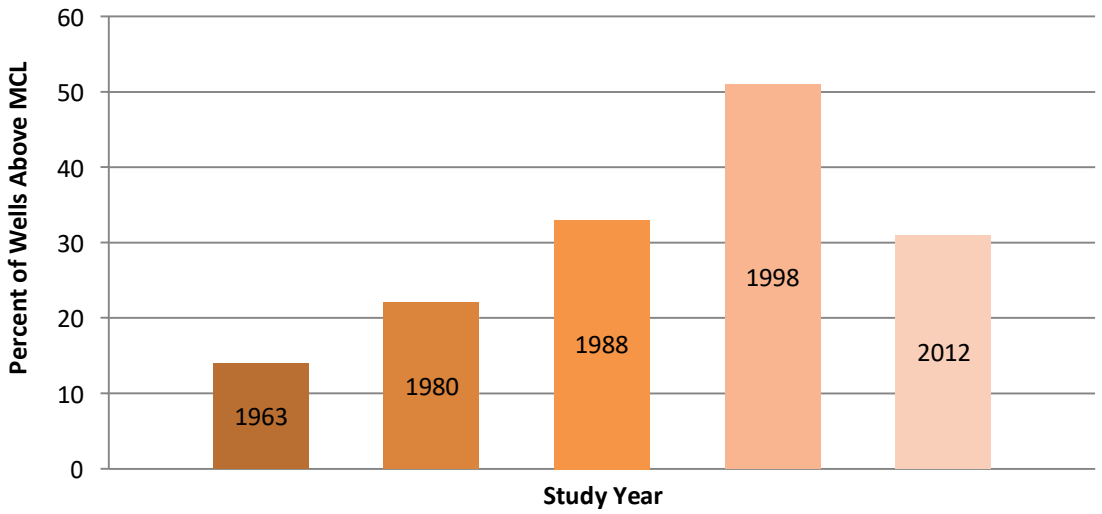
[4] Santa Clara Valley Water District, 2011 Groundwater Quality Report, 2012.

Figure 2-3 Nitrate Results



As discussed in Chapter 1, several nitrate monitoring efforts have previously been conducted in South County by DWR, the Santa Clara County Department of Environmental Health, and the District. A comparison of study findings indicates that the percent of wells exceeding the MCL has decreased with the latest 2012 results (Figure 2-4).

Figure 2-4 Percent of Wells Exceeding the Maximum Contaminant Level for Nitrate by Year



2.1.3 Electrical Conductivity

Measured values for electrical conductivity ranged between 316 and 2,570 umhos/cm. Approximately 15% percent of the wells tested had electrical conductivity values above the CDPH lower recommended aesthetic-based SMCL of 900 umhos/cm. Only 2 wells had electrical conductivity values above the upper CDPH SMCL of 1,600 umhos/cm. A breakdown of electrical conductivity by area is provided in Table 2-5 and measured levels are presented in Figure 2-5. Results of the electrical conductivity measurements indicate that, with respect to total mineral salts, groundwater quality appears suitable for ordinary domestic uses.

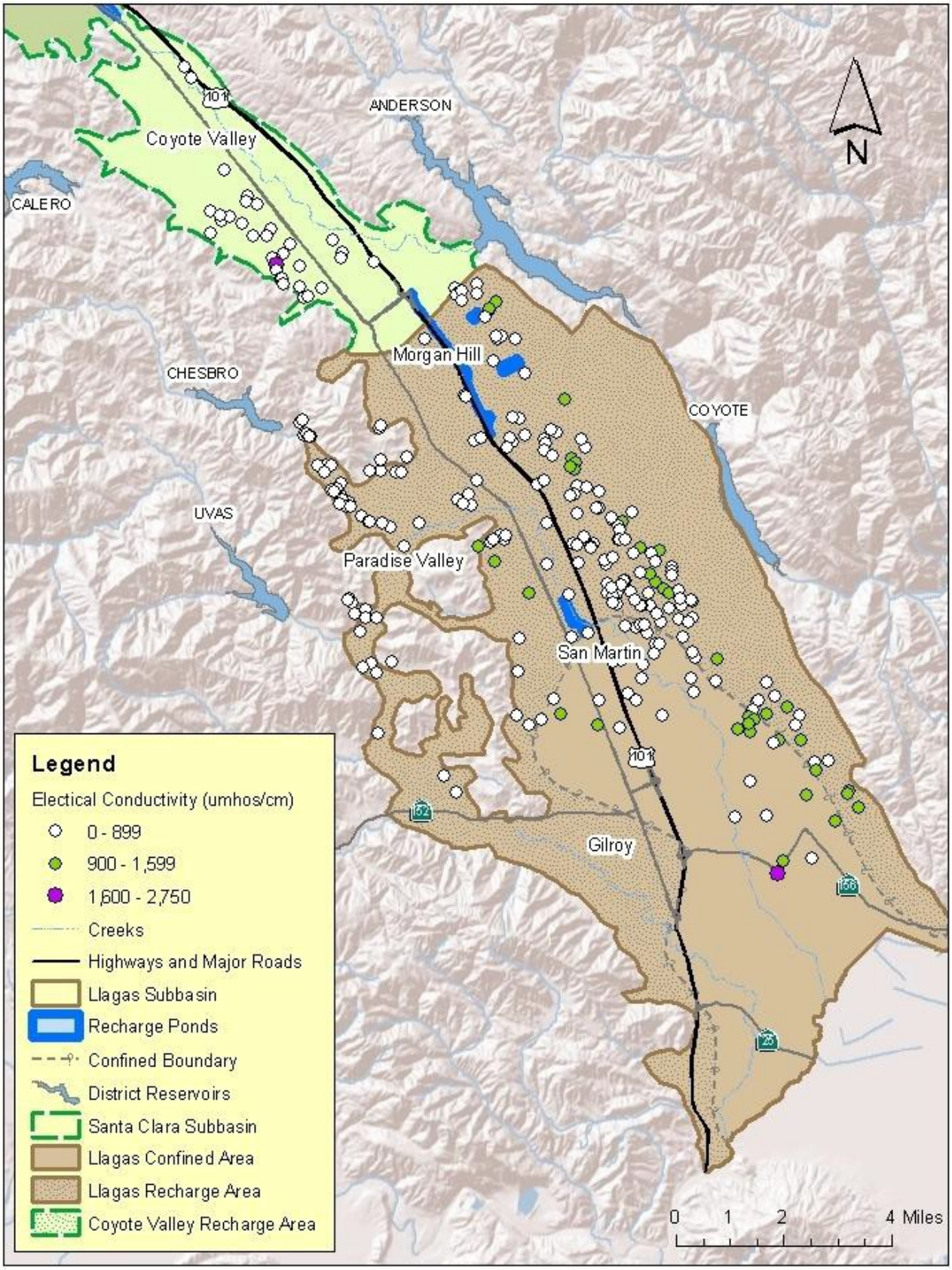
As discussed previously, electrical conductivity can be used to approximate TDS. Based on the sampling results shown in Table 2-5, the median TDS value for South County is approximately 365 mg/L to 500 mg/L. This is similar to median results reported in the District's 2011 Groundwater Quality Report for the Coyote Valley and Llagas Subbasin, which reported a median range of 359 mg/L to 426 mg/L.

Table 2-5 Electrical Conductivity Results

Location	Number of Wells Tested	Median Concentration (umhos/cm)[1]	Number of Wells above the SMCL[2]	Percentage of Wells above the SMCL[2]
Coyote Valley, Recharge Area	35	655	1	3%
Llagas Subbasin, Recharge Area	191	658	28	15%
Llagas Subbasin, Confined Area	39	706	12	31%
Uplands	14	729	1	7%
Total	279[3]	666	42	15%

Notes:
1. umhos/cm=micromohs per centimeter
2. Results are compared to the lower, recommended SMCL of 900 umhos/cm established by CDPH.
3. Due to a field equipment failure, one monitoring point was not sampled for electrical conductivity.

Figure 2-5 Electrical Conductivity Results



As with nitrate, the electrical conductivity in wells within 2,000 feet of District recharge facilities is generally lower than those in other areas. The median electrical conductivity near District recharge facilities is 580 umhos/cm, compared to 722 umhos/cm for all other areas (Table 2-6).

Table 2-6 Electrical Conductivity Results Near District Recharge Facilities

Location	Number of Wells Tested	Median Concentration (umhos/cm)[1]	Number of Wells above the SMCL[2]	Percentage of Wells above the SMCL[2]
Within 1,000 Feet of District Recharge Facility	67	577	2	3%
Within 2,000 Feet of District Recharge Facility	96	580	6	6%
All Other Areas	183	722	38	21%

Notes:
1. umhos/cm=micromhos per centimeter
2. Results are compared to the lower, recommended SMCL of 900 umhos/cm established by CDPH.

2.1.4 Hardness

Although hardness does not pose a health risk, hardness over 100 mg/L can be objectionable for ordinary domestic purposes, leaving unattractive residues on fixtures and causing poor detergent performance, among other problems. Water with hardness greater than 180 mg/L is considered very hard[5]. Hardness of water is due primarily to calcium and magnesium, which are naturally occurring minerals found abundantly in local watersheds. Well owners who are considering the purchase of many types of water treatment devices will find it useful to know the hardness of their water supply.

Hardness values for the wells tested in FY 2012 ranged from non-detect to 589 mg/L as calcium carbonate ($CaCO_3$), with a median value of 268 mg/L. The few samples having very low hardness (non-detectable) values were most likely obtained inadvertently from a point after a water softener. Figure 2-6 depicts the hardness results from this program. Table 2-7 provides the median hardness by subbasin as well as the number of wells with very hard water.

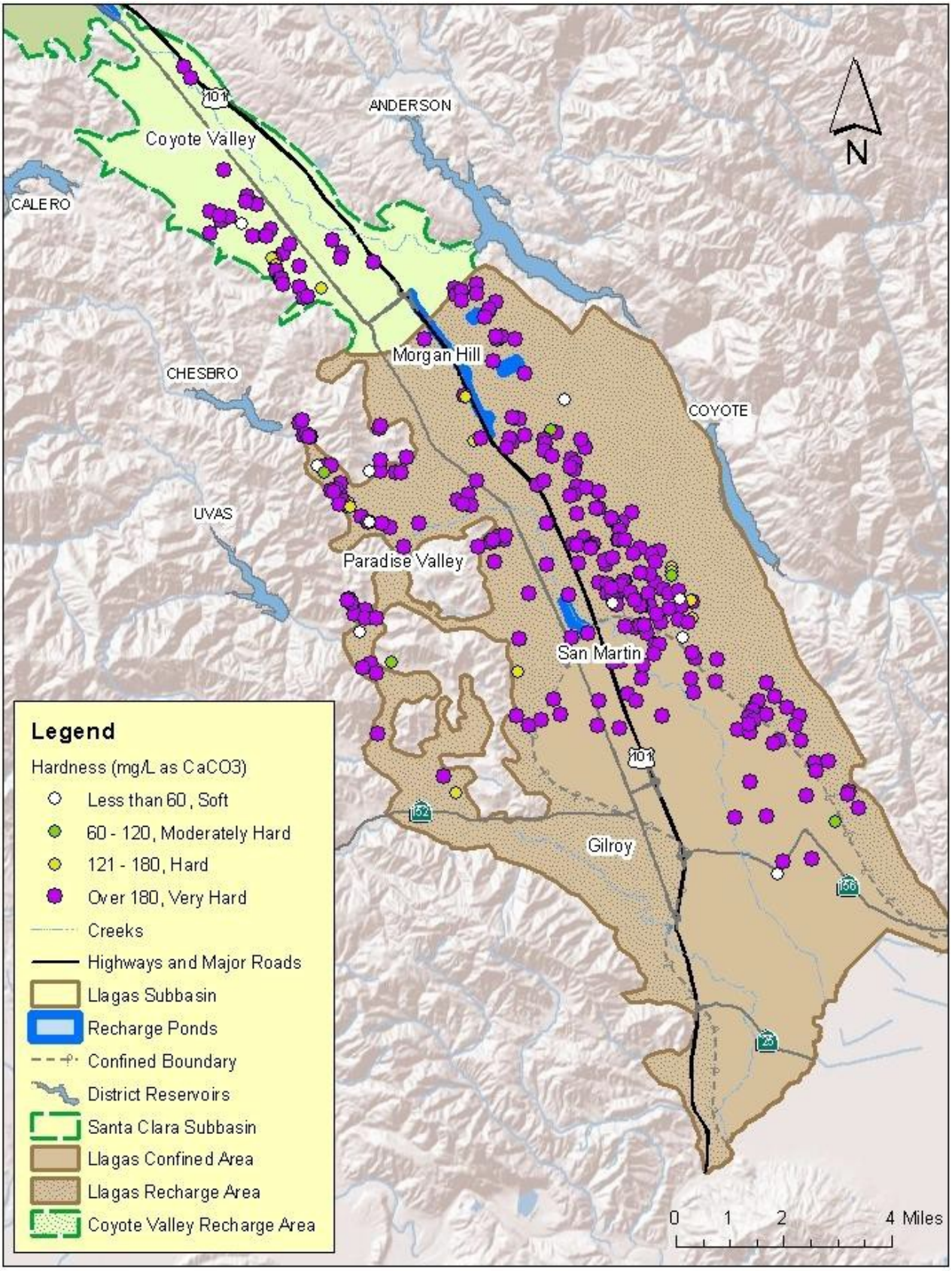
Table 2-7 Hardness Results

Location	Number of Wells Tested	Median Concentration (as $CaCO_3$)	Number of Wells with Very Hard Water	Percentage of Wells with Very Hard Water
Coyote Valley	35	262	31	89%
Llagas Subbasin, Recharge Area	192	260	169	88%
Llagas Subbasin, Confined Area	39	285	37	95%
Uplands	14	293	12	86%
Total	280	268	249	89%

Notes: Water with a hardness of more than 180 mg/L as calcium carbonate ($CaCO_3$) is considered very hard.

[5] Hem, J.D., Study and Interpretation of the Chemical Characteristics of Natural Waters, 1985.

Figure 2-6 Hardness Results



Wells in close proximity to District managed recharge facilities generally had hardness values that were somewhat lower than in other areas. The median hardness value in wells within 2,000 feet of recharge facilities is 240 mg/L as $CaCO_3$, whereas the median value in all other areas is 280 mg/L as $CaCO_3$ as shown in Table 2-8.

Table 2-8 Hardness Results Near District Recharge Facilities

Location	Number of Wells Tested	Median Concentration (as $CaCO_3$)	Number of Wells with Very Hard Water	Percentage of Wells with Very Hard Water
Within 1,000 Feet of District Recharge Facility	68	233	57	84%
Within 2,000 Feet of District Recharge Facility	97	240	87	90%
All Other Areas	183	280	166	89%

Notes: mg/L=milligrams per liter.

2.1.5 Non-Targeted Parameters

As described previously, the laboratory test for nitrate also provides results for bromide, fluoride, sulfate, and phosphate. There were not any exceedances above either health-based or aesthetic-based standards for any of these parameters for the wells tested under this program in FY 2012. The median concentrations are similar to regional median values for groundwater as reported in the District's 2011 Groundwater Quality Report. A summary of these results is presented in Table 2-9.

Table 2-9 Non-Targeted Parameter Results

Parameter	Median Concentration (mg/L)	MCL	SMCL
Bromide	0.13	--	--
Fluoride	0.14	2	--
Sulfate	34.75	--	250
Phosphate	<0.05	--	--

Notes:
1. MCL = Maximum Contaminant Level, or health-based standard set by the California Department of Public Health (CDPH).
2. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, set by the CDPH.

2.2 WELL OWNER FEEDBACK

In order to assess the satisfaction of participating well owners and identify ways to improve the program, customer surveys were provided to each well owner in the letter containing their laboratory results. Of the 270 surveys sent out to well owners[6], 94 responses were tabulated as of June 2012, indicating a 35 percent response rate. The results indicated that over 94% of respondents found out about the free testing program from the District postcard, while the remaining well owners learned about the program from the District's web site, a friend or neighbor, or other

[6] Some well owners have more than one domestic well that was tested.

source. Overall, the feedback was positive as shown in Tables 2-10 and 2-11, which provide a summary of survey responses.

Table 2-10 Participant Survey Results – Rating Questions

Rating Question	Excellent	Good	Fair	Poor	Not Sure/ Can't Rate	Count[1]
Turnaround time to book appointment	72.0%	25.6%	1.2%	0.0%	1.2%	82
Courtesy and helpfulness of the staff who booked the appointment	89.2%	9.6%	0.0%	0.0%	1.2%	83
Ease of using the District's Access Valley Water online customer service center (if used to book appointment)	76.2%	19.0%	4.8%	0.0%	0.0%	21
Ability to contact staff with additional questions or concerns	62.5%	13.8%	1.3%	0.0%	22.5%	80
District staff professionalism and friendliness	92.0%	6.9%	0.0%	0.0%	1.1%	87
Well owner understanding of the testing process as explained by District staff	74.7%	23.0%	0.0%	0.0%	2.3%	87
Explanation of the results	33.3%	51.7%	13.8%	0.0%	1.1%	87
Simplicity and clarity of the results packet and the other materials associated with the program	34.9%	46.5%	14.0%	3.5%	1.2%	86
Staff's ability to explain any additional questions or concerns	36.6%	20.7%	3.7%	0.0%	39.0%	82
Overall value of the South County Water Quality Testing Program	72.1%	23.3%	2.3%	0.0%	2.3%	86

Notes:

1. The response count for each question is lower than the total number of surveys tabulated (94) as some respondents skipped one or more survey questions.

Participants were also asked if the program were offered again, what frequency of testing they thought was appropriate. Of the 85 well owners who responded to this question, nearly 59% said the program should be offered annually, 22% said it should be every other year, and 18% said every 3 years. One well owner (1%) felt the program should not be offered again.

The survey results indicate that while the overall program feedback was very positive, additional effort should be made to simplify the reporting and explanation of the testing results. Individual comments were also received providing praise or suggestions for the program or asking specific questions. When contact information was provided, staff followed up with the well owner to address the questions raised in the survey. This feedback will be used to improve the program in FY 2013.

Table 2-11 Participant Survey Results – Yes/No Questions

Question	Yes	No	Count
Was the District's Access Valley Water online customer service center used to book the appointment?	23.7%	76.3%	93
Were District staff on time for the appointment?	98.8%	1.2%	85
Were the overall findings immediately clear when the results packet arrived?	76.0%	24.0%	75
Were the tests conducted helpful in understanding water quality?	97.6%	2.4%	83

2.3 CONCLUSIONS AND RECOMMENDATIONS

The District sampled 280 private domestic wells in South County under the South County Water Quality Testing Program in FY 2012. Wells were sampled for nitrate, coliform bacteria, electrical conductivity, and hardness to provide additional contaminant occurrence data for the District and to assist domestic well owners in better understanding their water quality. The overall conclusions of this sampling effort are summarized below, along with several specific recommendations.

2.3.1 Conclusions

Coliform bacteria are commonly encountered, with 38% percent of wells tested having total coliform bacteria present. This is similar to monitoring results reported by the USGS[7] in other parts of the country which show a large percent of wells with coliform bacteria present in domestic wells. As with the USGS study, the wells containing total coliform bacteria in South County are generally randomly distributed, suggesting the cause is due to individual well characteristics, such as unscreened vent caps and open access ports that allow foreign matter to enter the water system, rather a regional plume of contamination. The upland areas have a higher incidence of total coliform present (71% of wells tested) as compared to other areas. This may be due to the location of the wells, as less soil cover over the bedrock is available to filter percolating water, or may be due to natural fractures within the bedrock that facilitate the transport of contaminated surface water to the wells.

E. coli are rarely encountered in well water indicating that sewage and animal waste contamination of the aquifer appears to be very rare. Only about 1% of wells tested positive for this contaminant. Additionally, the few occurrences of E. coli were clustered in one relatively small area in the uplands, suggesting a single source such as a malfunctioning septic system, or unique local geologic conditions.

Nitrate remains elevated above natural background levels (10 mg/L), with a typical level of about 31 mg/L for all the areas tested. This is higher than the regional nitrate levels for the Coyote Valley and Llagas Subbasin which were reported at 11 mg/L and 21 mg/L, respectively, as part of the District's regional groundwater monitoring efforts[8]. Approximately 31% of wells tested in FY 2012 had nitrate above the drinking water standard of 45 mg/L. In 1998, over 50% of the wells tested by the District had nitrate above 45 mg/L. Although the total number of wells tested during FY 2012 is less than those tested in 1998 and the distribution is slightly different, these results suggest

[7] United States Geological Survey, Relation Between Selected Well-Construction Characteristics and Occurrence of Bacteria in Private Household-Supply Wells, South-central And South-eastern Pennsylvania, Report 01-4206, 2001.

[8] Santa Clara Valley Water District, 2011 Groundwater Quality Report, June 2012.

groundwater nitrate concentrations have improved since the last basin-wide testing program. Nitrate levels were generally higher in wells tested in the confined area of the Llagas Subbasin (median level of 58 mg/L) as opposed to recharge areas in the Coyote Valley and Llagas Subbasin (median levels of 35 and 29 mg/L, respectively). Wells tested near District groundwater recharge facilities also showed lower levels of nitrate and a lower incidence of exceeding the MCL. About 14% of wells within 2,000 feet of a District recharge facility had nitrate above the MCL while 40% of wells tested in all other areas exceeded the MCL. This suggests that the District's managed recharge of high quality local and imported surface water is helping to reduce nitrate concentrations in groundwater.

Based on electrical conductivity measurements, groundwater appears suitable for domestic purposes with respect to total mineral salts at nearly all wells tested. Approximately 15% of wells had electrical conductivity above the lower limit of the aesthetic-based SMCL (900 umhos/cm). However, only 2 wells (less than 1% of wells tested) exceeded the higher SMCL of 1,600 umhos/cm. Groundwater in the Coyote Valley and Llagas Subbasin is generally classified as very hard due to a natural abundance of calcium and magnesium in local watersheds. Well owners who are considering the purchase of many types of water treatment devices to address nitrate and other contaminants will find it useful to know the hardness of their water supply.

Results for bromide, fluoride, sulfate, and phosphate (obtained from the same laboratory method as nitrate) indicate there were no exceedances above health-based or aesthetic-based standards for any of these parameters. Median concentrations were similar to regional values reported in the District's 2011 Groundwater Quality Report.

Recommendations

The FY 2012 South County Water Quality Testing Program provided the District with additional data on the occurrence of contaminants such as nitrate and bacteria, which helps to better protect groundwater resources. The comparison of nitrate data against previous large-scale sampling efforts suggests that conditions are generally improving, however there are still many domestic wells containing nitrate above the drinking water standard of 45 mg/L. This report evaluated the spatial distribution of water quality results and found variations in water quality based on geographic location (e.g., confined area versus recharge area) and proximity to District groundwater recharge facilities. The evaluation of FY 2012 results did not attempt to discern potential water quality differences between shallow and deeper aquifer zones, which would require the investigation of well construction information. That analysis is recommended for future sampling efforts.

This testing program also provided important water quality information to private domestic well owners. The groundwater quality from these wells is not regulated by state or federal agencies, and it is assumed the water quality in many wells is rarely tested. The District plans to continue this program in FY 2013, which will support our efforts to help domestic well owners better understand their water quality so they can protect their health. As described above, the participant surveys were generally very positive, although additional effort should be made to simplify the reporting and explanation of the testing results. The relatively high occurrence of total coliform bacteria suggests that additional outreach to domestic well owners on wellhead protection may be beneficial. The continued presence of nitrate above the MCL in many domestic wells also highlights the need for continued efforts to reduce customer exposure to nitrate through targeted outreach and to reduce nitrate loading in coordination with the Central Coast Regional Water Quality Control Board (Water Board) and basin stakeholders.

Lastly, the District should continue to explore opportunities for partnerships and external funding as it may apply to this program in the future. The Central Coast Water Board is pursuing nitrate testing for domestic wells in high-priority areas but their initial efforts will not include the Llagas Subbasin. Staff will continue to work with Central Coast Water Board staff to discuss possible partnerships and funding opportunities for domestic well testing in the future.

PARTICIPATION AGREEMENT AND OUTREACH MATERIALS

Santa Clara Valley Water District Water Quality Testing Program

PARTICIPANT AGREEMENT & RELEASE FORM

PARTICIPANT INFORMATION

Name:_____Date:_____

Address:_____City: _____

Zip Code:_____Phone: (_____)_____Well ID:_____

PARTICIPATION AGREEMENT

I hereby give permission to the Santa Clara Valley Water District ("District") to allow its trained sampling staff to enter onto my property for the purpose of collecting water samples. I acknowledge that I am responsible for ensuring that the quality of my water is safe to drink, and that any activities beyond this sample collection (including additional sampling, well disinfection, or water quality treatment) are my sole responsibility. In consideration for the anticipated benefits of my participation in the District Water Quality Testing Program, I hereby release the District (including its directors, employees, and contractors) from any and all liability resulting from any of the District's activities on my property. I acknowledge that the information obtained through this program, including my water quality data, is subject to public release by the Santa Clara Valley Water District. I understand that the District does not make any express or implied warranties (including the implied warranty of fitness for a particular use) regarding the suitability of the water sample results or any reports or information dependent on those results. Any use of the water sample results or related reports is at my own risk. I have read and understand this agreement.

_____ _____

Resident Date

Appointment Reminder

South County Water Quality Testing Program

Santa Clara Valley Water District

Thank you for participating in the water district's South County Water Quality Testing Program.

Your appointment is scheduled for

Date:

Time:

Why we're providing thistesting

- To provide basic water quality information to residents served by private domestic wells so you can better protect your health.
- To collect information that helps us to improve groundwater protection efforts.

What to expect during your testing appointment

- We will come to your residence during your scheduled appointment and collect a sample from your kitchen sink faucet, or a tap outside your home.
- If you have a filter, treatment system, or water softener connected to your kitchen sink faucet, we will collect the sample from an outside hose bib.
- If your well is also shared by other users, we will collect the sample from a tap at the well, if possible.
- We will also be confirming the location of your well. This helps us to associate the water quality results with the groundwater source.
- We are happy to provide information and tips on well maintenance and water quality, but we will not be assessing the condition of your well or any treatment system.
- The sample collection should take approximately 30 minutes.

What you should do before the appointment

- Please read and sign the attached Participant Agreement Release Form prior to our arrival. We cannot enter your residence or collect a sample without a signed form.
- If you would like us to collect the sample from your kitchen sink, please make sure it is clean and free of clogs since we will need to run the water for approximately five minutes at full flow.
- If you have a filter, treatment system, or water softener, we will be collecting the sample outside your home. Please make sure an outdoor hose bib is accessible and that the hose is removed.

When you will get your results

- You will get a copy of the laboratory results within three weeks of your sample appointment. We will also provide information on the results and additional actions you may want to take.
- If you use water from a shared well, the results will also be provided to other well users upon their request.
- We hope you will also take the time to fill out the survey that will be included with your results. This will help determine if this program will be offered again in the future, and if so, how it can be improved.

If you have any questions, please call the Groundwater Hotline at (408) 265-2607, ext. 2300 or use Access Valley Water on valleywater.org.

Fact Sheet

Understanding Water Quality Testing Results

Santa Clara Valley Water District

The water district encourages private well owners to test your water quality annually, or more often if there is a change in color, taste, or odor. Unlike public water systems, private domestic wells do not have to meet drinking water standards. However, comparing your testing results to these standards can help provide context for understanding water quality. A primary Maximum Contaminant Level (MCL) is a health-based regulatory standard for public water systems, which must take action if a substance is above the MCL. A secondary MCL is a drinking water standard related to taste, odor, or the appearance of drinking water, rather than health effects.

Nitrate

What is it?

Nitrate is colorless and odorless and is naturally present in the soil. Small amounts of nitrate are normal, but excess amounts can pollute groundwater. Common sources of nitrate are fertilizers, septic systems, and animal waste.

What is the safe level of nitrate in drinking water?

Nitrate can interfere with the blood's ability to transport oxygen. It is of greatest concern for infants and pregnant women and the effects are often referred to as "blue baby syndrome." The California Department of Public Health (CDPH) has set a health-based MCL for nitrate of 45 milligrams per liter (mg/L) as NO3, or nitrate.

How can I treat it in my water?

If your results indicate nitrate is above the MCL, you may want to consider further testing or treatment (See "More FAQs" on the back). Do not boil the water as this will not remove nitrate, but may actually increase the nitrate level. Treatment technologies include reverse osmosis, distillation and ion exchange.

Total Coliform/E.Coli

What is it?

Coliforms are bacteria that are naturally present in humans, animals and the environment. They do not normally cause illness but should not be present in drinking water. Coliform bacteria are used as an indicator that other, potentially harmful, bacteria may be present. Escherichia coli (E. coli) bacteria are found in humans and animals and are indicators of fecal contamination.

What is the safe level of bacteria in drinking water?

Coliform bacteria do not normally cause illness. Most strains of E. coli are also harmless, but some strains can cause short-term effects, such as diarrhea, cramps, nausea, headaches or other symptoms. They may pose a special health risk for infants, young children, the elderly and people with severely compromised immune systems.

Bacteria should not be present in drinking water and public water systems are required to monitor for bacteria to ensure that fewer than 5 percent of all samples test positive for total coliform. Laboratory results are typically reported as "present" or "absent" for total coliform and E. coli organisms. According to the Santa Clara County Department of Environmental Health, the test results can be interpreted as follows:

TEST RESULTS

Total Coliform	E. Coli	Water Quality
absent	absent	safe
present	absent	questionable
present	present	unsafe

If your test results indicate that E. coli is present, the Department of Environmental Health recommends that you switch to bottled water for drinking and cooking.

How can I treat it in my water?

The sample collected by the water district may have been taken from your kitchen sink, an outside tap, or a tap at your well. If the sample was not collected at the well and bacteria are present, you may want to sample your well directly to verify the source of the bacteria. To eliminate bacteria in your water, you should disinfect your water system (See "More FAQs" on the back). Prior to disinfection, you may want to locate and eliminate the bacteria source by checking for obvious physical defects in your water system and making appropriate repairs.

Electrical Conductivity

What is it?

Electrical conductivity (EC) is a measure of all the dissolved substances in your water. By itself, EC does not tell you if your water is safe to drink but it can be used as an indicator of changing conditions that may require further testing.

What is the safe level of EC in drinking water?

There are no health effects associated with electrical conductivity. The CDPH has established a secondary MCL of 900 umhos/cm for EC. This standard applies only to public water systems and is not a health-based standard, but relates to the taste, odor, or the appearance of drinking water.

How can I treat it in my water?

Treatment technologies include reverse osmosis, deionization and distillation.

continued on back...

Hardness

What is it?

Hardness is caused by high concentrations of dissolved calcium and magnesium in water. As water moves through soil and rock, it dissolves these naturally-occurring minerals and carries them into groundwater. Hardness can be a nuisance due to mineral buildup on plumbing fixtures and poor soap and detergent performance.

What is the safe level of hardness in drinking water?

Hardness does not pose a health risk. In fact, hard water may help you meet daily requirements for calcium and magnesium in your diet. There is no drinking water standard for hardness. Hardness of 75 to 150 mg/L is usually considered optimal for domestic drinking water. Water harder than 250 mg/L is considered very hard.

How can I treat it in my water?

Treatment technologies include water softening or ion exchange.

Fluoride, Bromide, Phosphate & Sulfate

The test method to determine the level of nitrate also provides results for bromide, fluoride, phosphate, and sulfate.

What are they?

Fluoride, phosphate, and sulfate primarily originate from the erosion of natural soil and rock deposits, although there are some industrial sources. Bromide sources include natural soil and rock deposits, salt water, and industrial applications.

What is the safe level in drinking water?

Because excess fluoride can cause bone disease or mottled teeth, the CDPH has set a health-based MCL of 2 mg/L. Due to taste, odor, or appearance effects on drinking water, the CPDH has established a secondary MCL of 250 mg/L for sulfate. There are no drinking water standards for bromide or phosphate.

How can I treat it in my water?

If your results indicate fluoride is above the MCL, you may want to consider further testing or treatment. Treatment technologies include reverse osmosis, distillation and filtration.

More FAQs

What if I want to do additional testing?

A list of local state-certified laboratories is available on the water district's website (search "certified labs" on www.valleywater.org) or you can contact us for more information. The county public health laboratory in San Jose also conducts testing for bacteria and can be reached at (408) 885-4272.

How do I disinfect my water system?

The Guide for the Private Well Owner has information on potential contamination sources and recommended actions. Search "private well guide" on www.valleywater.org or contact the water district. The County Department of Environmental Health has detailed instructions for disinfecting a water system. Search "disinfection" on www.ehinfo.org or contact the county at (408) 918-3400.

Where can I find a water treatment professional?

Check the yellow pages under "Water Filtration and Purification" or use the tool on the Water Quality Association website (www.wqa.org) to find professionals in your area. We recommend you get a guarantee that the system you are considering will work in your situation. Remember that most treatment systems require regular maintenance to function properly and improperly maintained systems can cause more harm than not having a system at all.

Where can I get more information on health effects?

- U.S. EPA Safe Drinking Water Hotline: water.epa.gov/drink/hotline or (800) 426-4791
- California Department of Public Health: www.cdph.ca.gov or (916) 449-5600
- Santa Clara County Department of Environmental Health: www.ehinfo.org or (408) 918-3400
- Your health care provider

Contact us

For more information, contact the **Groundwater Hotline** at **(408) 265-2607, ext. 2300**, or visit our website at www.valleywater.org and use our **Access Valley Water** customer request and information system. With three easy steps, you can use this service to find out the latest information on the project or to submit questions, complaints or compliments directly to a district staff person. On our website, you can also subscribe to our monthly newsletter, Valley Water e-News.

© 2012 Santa Clara Valley Water District • 01/24/11

customer survey

South County Water Quality Testing Program

Santa Clara Valley Water District

Thank you for partcipating in the water quality testing program. Your input is important to us. Please take a moment to complete this survey and return it to the water district in the enclosed postage-paid envelope. Thank you in advance for your time.

1. How did you find out about the South County Water Quality Testing program?

- ☐ Postcard from the water district
- ☐ Water district web site
- ☐ Friend or neighbor
- ☐ Other: _____

2. When you booked your appointment did you use the water district's Access Valley Water online customer service center?

☐ Yes ☐ No

If yes, how would you rate the ease of using the online system?

excellent	good	fair	poor	not sure or can't rate
☐	☐	☐	☐	☐

Overall how would you rate…

	excellent	good	fair	poor	not sure or can't rate
a. The turnaround time to book your appointment?	☐	☐	☐	☐	☐
b. The courtesy and helpfulness of the staff who booked your appointment?	☐	☐	☐	☐	☐
c. Your ability to contact staff with additional questions or concerns?	☐	☐	☐	☐	☐

3. When the water district staff conducted your home test, were they on time for the appointment?

☐ Yes ☐ No

How would you rate…

	excellent	good	fair	poor	not sure or can't rate
a. Their professionalism and friendliness?	☐	☐	☐	☐	☐
b. Your understanding of the testing process as explained by the water district staff?	☐	☐	☐	☐	☐

continued »

4. When you received your results packet, were the overall findings immediately clear to you?

☐ Yes ☐ No

How would you rate…

	excellent	good	fair	poor	not sure or can't rate
a. The explanation of the results?	☐	☐	☐	☐	☐
b. The simplicity and clarity of the results packet and the other materials associated with the testing program?	☐	☐	☐	☐	☐
c. The staff's ability to explain any of your additional questions or concerns?	☐	☐	☐	☐	☐

5. How would you rate the overall value of the South County Water Quality Testing Program?

☐ Excellent ☐ Good ☐ Fair ☐ Poor ☐ not sure or can't rate

6. Were the tests conducted helpful in understanding your water quality?

☐ Yes ☐ No

7. If this program were offered again, what frequency of testing do you think is appropriate?

☐ Annually ☐ Every other year ☐ Every three years ☐ Should not be offered again

8. If you have additional feedback on the water quality testing program, please provide it below:

9. If you would like us to contact you directly to follow-up on any issues or concerns, please provide your contact information:

Name:

Address:

Phone:

E-mail:

If you have any questions about this survey, please contact the Customer relations Hotline at **(408) 265-2607, ext. 2000**.

Santa Clara Valley Water District

5750 Almaden Expressway, San Jose, CA 95118

(408) 265-2600 | www.valleywater.org

© Santa Clara Valley Water District • July, 2012, JL